Research Investments in Information Security

Just as the Air Force saw value in supporting early computer research, AFOSR continues to support research that contributes to the Air Force's core competency of information superiority:

Information Warfare: Networks are becoming critical to day-to-day operations in both wartime and peacetime. Researchers are working on new methods to detect unforeseen network intrusions, automatically recover corrupted systems, and provide mechanisms for software to formally prove its own safety. Future systems will have to be able to dynamically adjust to a variety of hostile environments, detecting and responding to attacks that have never been seen before.

High Performance Knowledge Bases: The scope of military conflicts and the complexity of weapons systems continue to grow at an alarming rate. This research involves in-depth knowledge that is encoded into a form that allows the computer to perform abstract reasoning and provide expert support for human decision-makers. While current knowledge bases contain around 10,000 axioms, future knowledge bases will contain 10 million axioms. The difference in capabilities is that, while current knowledge bases can, for example, *trouble-shoot* car problems, future knowledge bases will be able to *design* a car. Current knowledge bases can answer complex geo-political questions such as: *"What are Saudi options to respond to Iran's closing of the Straits of Hormuz?"*

Intelligent Agents: This research involves creating software entities that act on the behalf of a human. Agents are typically proactive, autonomous, highly personalizable and sometimes mobile, with the capability to independently move across networks to different machines. Agents seek out information and solve problems on their own, with little involvement from the human. Software agents have the potential to completely revolutionize the way we use computers, making the process much more like human to human interaction.

Component-Based Software: Software is often still the most difficult part in any new weapon system development. This research is developing new theoretical foundations to allow "tinker toy" type software development, where proven components can be easily assembled to produce complete software systems in much less time than in the past. These components can easily be re-used across different systems, and customized for the task at hand without requiring any knowledge of the underlying structure of the component.

Capt. Alex Kilpatrick
AFOSR/NM
(703) 696-6565, DSN 426-6565

Research Highlights

Air Force Office of Scientific Research
Communications and Technical Information
4040 Fairfax Dr. Suite 500
Arlington, VA 22203-1613

Director: Dr. Joseph F. Janni

Web site: www.afosr.af.mil

DSN 426-7311 or 426-3722
Comm: (703) 696-7305 or (703) 696-7307
Fax: (703) 696-7320
e-mail: afosrinfo@afosr.af.mil

Editor: Jean Schaefer

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Have an idea for a story? Contact Jean Schaefer at: (703) 696-7305 or by e-mail at: afosrinfo@afosr.af.mil

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Science and Technology for Tomorrow's Aerospace Force

Air Force Office of Scientific Research
Communications and Technical Information
4040 Fairfax Drive, Suite 500
Arlington, VA 22203-1613